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MAR 28 2011Appl. No. 10/595,875
Response to Final Action of December 28, 2010EXPEDITED PROCEDURE
PATENT
Docket No.: PHDE030394US1
Customer No. 24737**Amendment to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A device for the three-dimensional reconstruction of a moving object in a body volume, comprising a memory for storing a series of two-dimensional projection photographs ($A_1, A_2, \dots, A_n, \dots, A_N$) of the body volume from different directions and states of the body volume, and a data processing unit coupled to the memory for executing the following steps:
 - a) segmenting a projection image ($Pr_n(Q)$) of at least one feature point (Q) of the object or its surroundings in each of the projection photographs;
 - b) specifying randomly a spatial reference position (Q_0) for the at least one feature point (Q) of the object or its surroundings on which subsequently all of the projection photographs are to be aligned, wherein the spatial reference position (Q_0) of a corresponding at least one feature point (Q) is randomly specified from two projection photographs (i) that originate from a similar state of the body volume (ii) but from different directions;
 - c) calculating transformations (Σ_n, σ_n) of the object space and of the projection photographs which link positions of the feature points for different states of the body volume, wherein the a projection of the a transformed randomly specified spatial reference position (Q_0) coincides with a respective transformed image of the a corresponding at least one feature point (Q) for the different states of the body volume; and
 - d) reconstructing the object three-dimensionally from the stored two-dimensional projection photographs using the calculated transformations (Σ_n, σ_n), wherein reconstructing includes using all transformed projection photographs from the different states of the body volume.

Appl. No. 10/595,875
Response to Final Action of December 28, 2010

EXPEDITED PROCEDURE
PATENT
Docket No.: PHDE030394US1
Customer No. 24737

2. (Canceled)

3. (Previously Presented) The device as claimed in claim 1, wherein the transformation (Σ_n) of the object space or the transformation (σ_n) of the projection photographs is the same image.

4. (Canceled)

5. (Previously Presented) The device as claimed in claim 1, wherein the transformations (σ_n , Σ_n , Σ_{p_m}) comprise one of a translation, a rotation, a dilation, and an affine transformation.

6. (Previously Presented) The device as claimed in claim 1, further comprising an input unit for interactive segmentation in step a).

7. (Previously Presented) The device as claimed in claim 1, further comprising an image-producing device for producing the series of two-dimensional projection photographs ($A_1, A_2, \dots, A_n, \dots, A_N$) of the body volume.

8. (Previously Presented) The device as claimed in claim 1, further comprising a sensor device for recording a parameter (E_n) that characterizes a cyclical self-movement of the body volume in parallel with the production of the projection photographs.

9. (Currently Amended) A method for the three-dimensional reconstruction of a moving object in a body volume based on a quantity of data which contains a series of two-dimensional projection photographs ($A_1, A_2, \dots, A_n, \dots, A_N$) of the body volume from different directions and states of the body volume, comprising the steps of:

Appl. No. 10/595,875
Response to Final Action of December 28, 2010

EXPEDITED PROCEDURE
PATENT
Docket No.: PHDE030394US1
Customer No. 24737

- a) segmenting a projection image ($Pr_n(Q)$) of at least one feature point (Q) of the object or its surroundings in each of the projection photographs;
- b) specifying randomly a spatial reference position (Q_0) for the at least one feature point (Q) of the object or its surroundings on which subsequently all of the projection photographs are to be aligned, wherein the spatial reference position (Q_0) of a corresponding at least one feature point (Q) is randomly specified from two projection photographs (i) that originate from a similar state of the body volume (ii) but from different directions;
- c) calculating transformations (Σ_n, σ_n) of the object space and of the projection photographs which link positions of the feature points for different states of the body volume, wherein the a projection of the a transformed randomly specified spatial reference position (Q_0) coincides with a transformed image of the a corresponding at least one feature point (Q) for the different states of the body volume; and
- d) reconstructing the object three-dimensionally from the series of two-dimensional projection photographs using the calculated transformations (Σ_n, σ_n), wherein reconstructing includes using all transformed projection photographs from the different states of the body volume.

10. (Canceled)

11. (Currently Amended) The device as claimed in claim 2, claim 1, further wherein the two projection photographs that originate from the similar state of the body volume comprise two projection photographs that originate from a heartbeat phase of the same type.

12. (Previously Presented) The device as claimed in claim 7, further wherein the image-producing device comprises one of (i) an X-ray apparatus, (ii) an NMR device, and (iii) both an X-ray apparatus and an NMR device.

Appl. No. 10/595,875
Response to Final Action of December 28, 2010

EXPEDITED PROCEDURE
PATENT
Docket No.: PHDE030394US1
Customer No. 24737

13. (Previously Presented) The device as claimed in claim 8, further wherein the sensor device comprises one of (i) an electrocardiograph device, (ii) a respiration sensor, and (iii) both an electrocardiograph device and a respiration sensor.